

Managing Under Challenging Circumstances

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Why So Much Uncertainty

- We seem to see uncertainty everywhere we turn
 - Is it poor planning?
 - Is it poor execution?
 - Is it inevitable?
- Can it be avoided?
- Why not address all this uncertainty before we start our missions?

Where Does It Come From

- Challenging Missions
 - We do these because of the challenges
 - A certain amount of uncertainty is inherent in these missions
- Aggressive Schedules
 - Key to managing cost
 - We can't afford the luxury of knowing everything before we start
- New Technologies and Approaches
 - Uncertainty is always present

What Should We Do

- Can we reduce the amount of uncertainty
 - Should we plan better?
 - Should this be recognized as we select what we do?
- How can we manage uncertainty
 - Can we ignore it?
 - Who is responsible for managing it?
 - Is it just another risk?
 - Can we reduce it?

Managing Uncertainty with The ST-5 Mission

ST-5 Background

- New Millennium Mission
 - New technology validation
 - High risk – by design
- Development of three micro-sats
- Started in late 1999
- Launch set for 2003
- Baselined as a secondary payload

What Uncertainty Was There

- New technologies
 - Managed as technical risks
 - Jointly “owned” by Systems and Project Management
 - Challenges recognized by all
- Aggressive cost and schedule baseline
 - Was the project going to survive confirmation
- Challenges of being a secondary payload
 - Could the mission survive this uncertainty

Managing ST-5

- Technical, schedule and cost
 - We face these risks regularly
 - Managed as risks
 - It was significant and challenging
- Lack of a confirmed launch
 - This challenge was new to all of us
 - The difficulty of acquiring a ride was underestimated by all
- Could the mission survive this level of uncertainty?

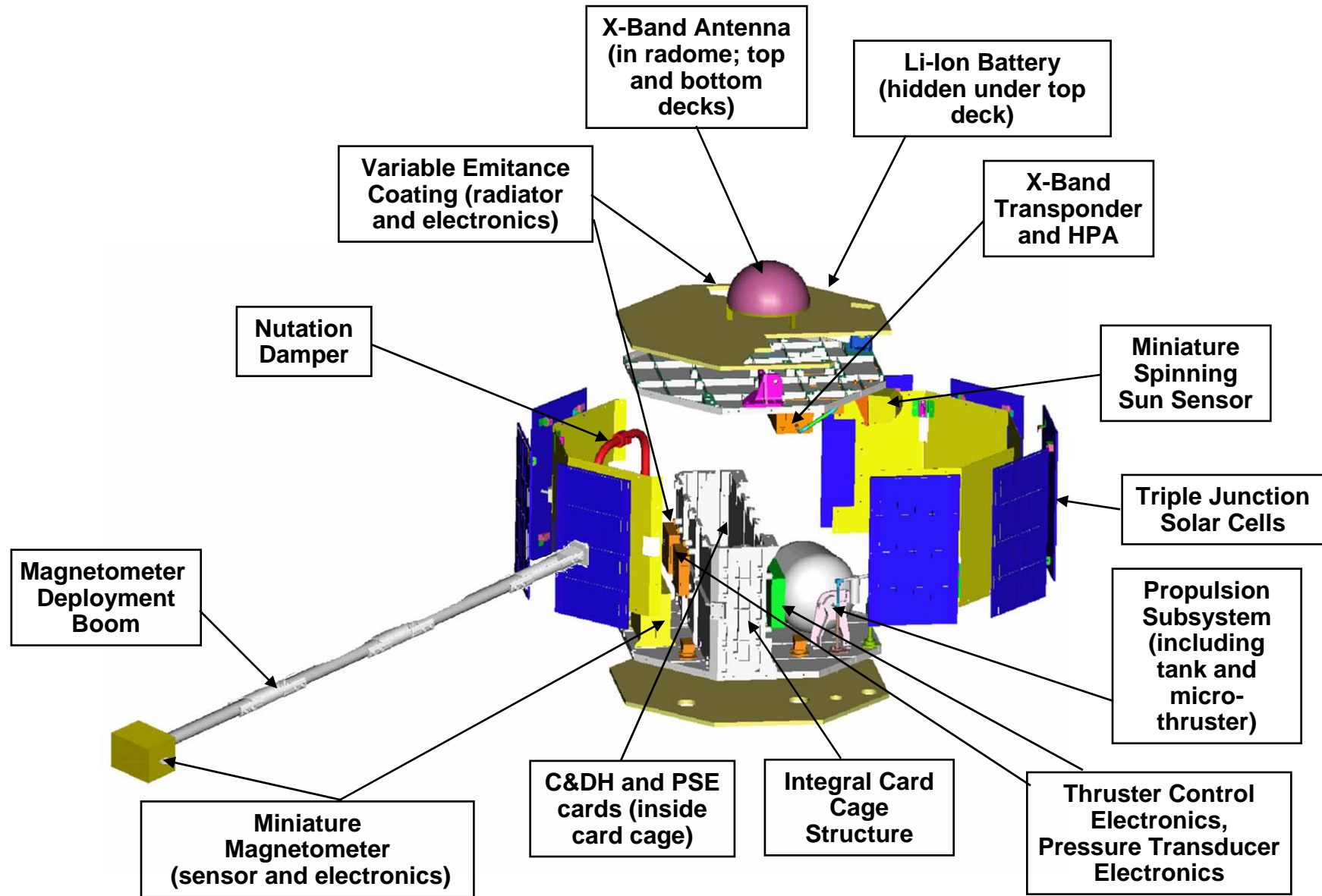
Launch Vehicle Uncertainty

- Technical Approach
 - Baseline approach followed through SDR
 - Defined “generic” interface to support PDR
 - Flexibility shown at CDR
 - Delta-CDR supported Pegasus configuration
- Impact on the team
 - Would the mission survive?
 - Communication was critical
 - Credible technical approach was key

What Happened

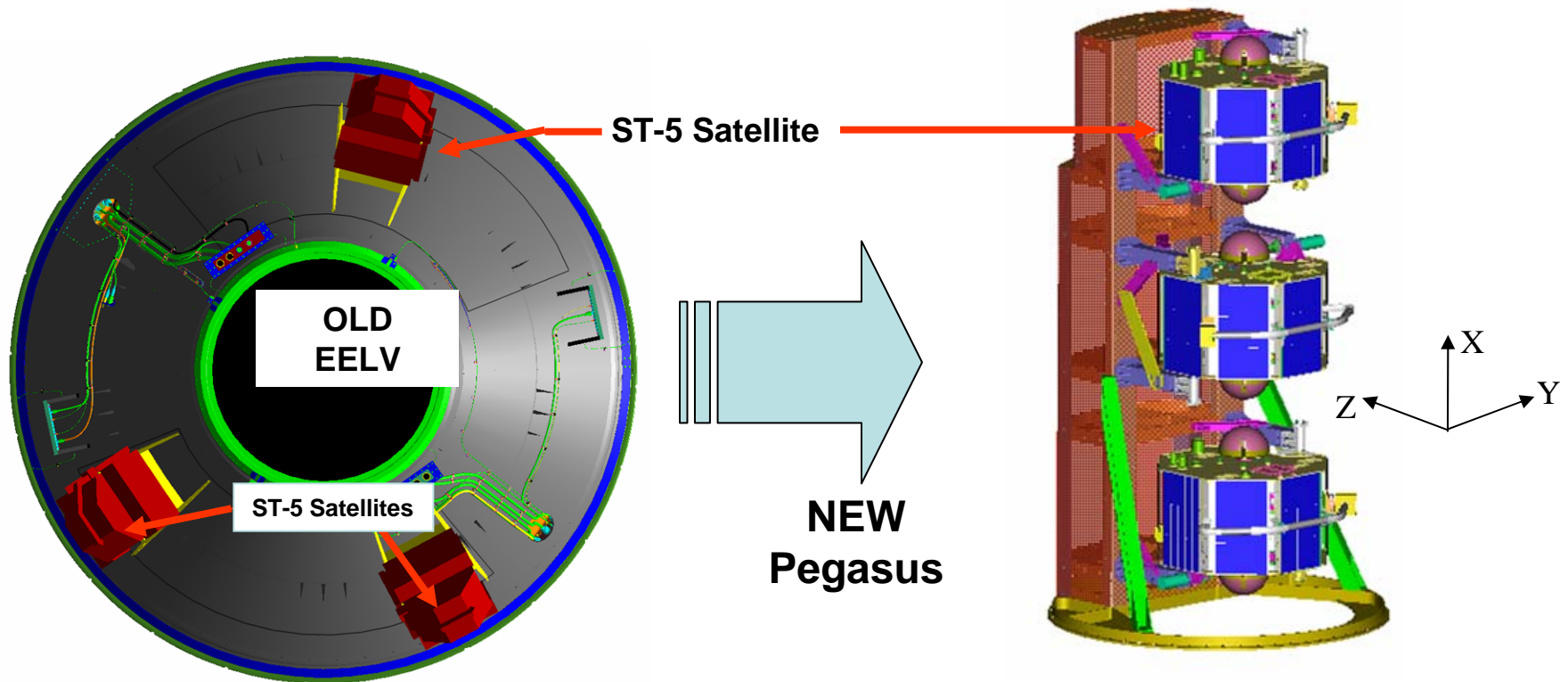
- Secondary launch never materialized
- Robust design “saved” the mission
- Successfully launched in March 2006
- Extremely successful Project
 - Met all requirements
 - Grew a new generation of engineers and managers
 - Stepping stone for future multi-spacecraft missions

ST-5 Spacecraft Overview

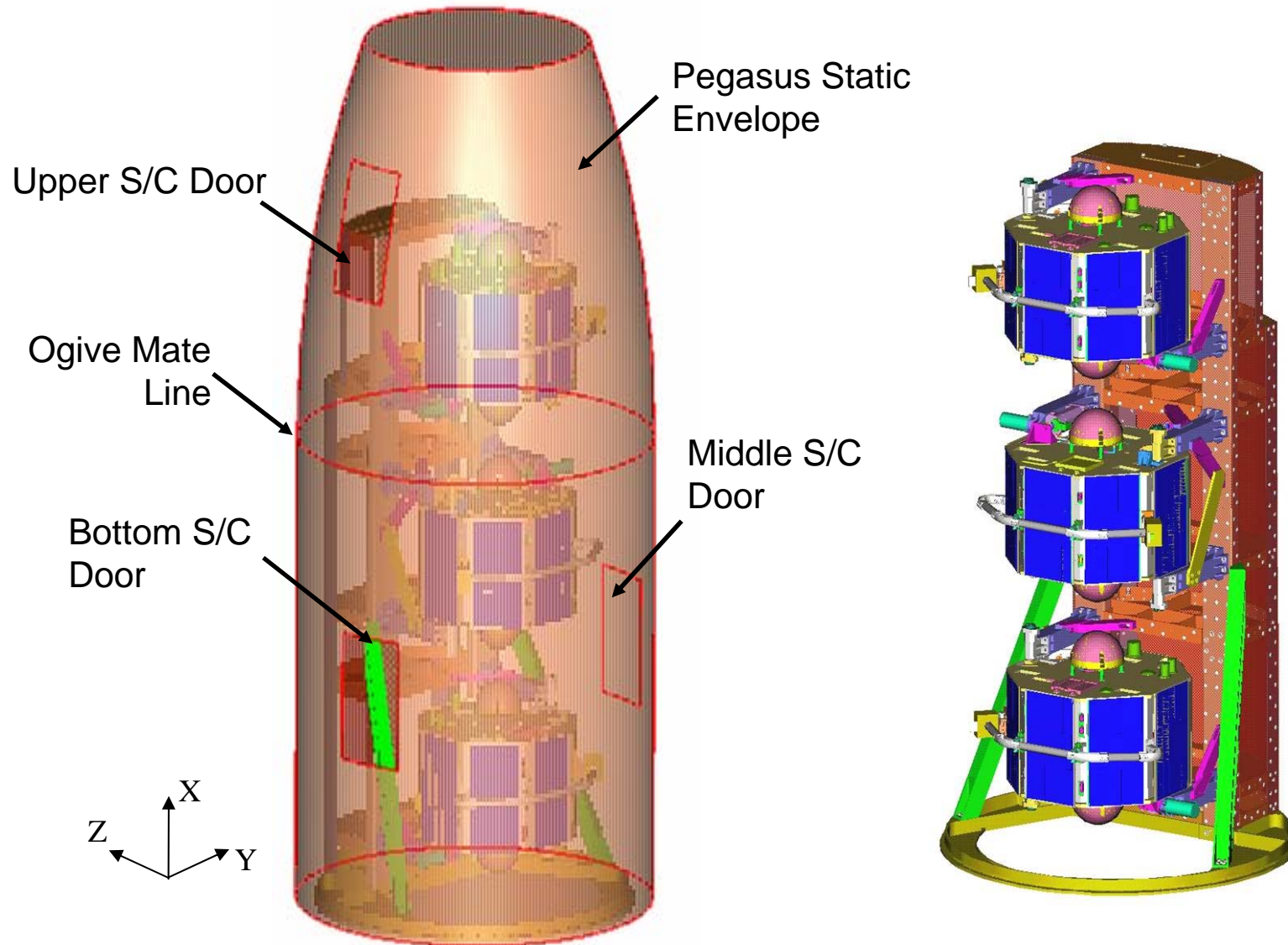


Revised Launch Vehicle Accommodation

- Old EELV secondary payload accommodation with three discrete PAF S/C mounting locations
- Replaced by single structure with co-planar “stacked” mounting locations on Pegasus® common column support



Pegasus Fairing Accommodation



All 3 ST-5 Spacecraft in Clean Tent



Spacecraft on Deployment Structure

